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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/698,246	10/30/2000	Dengwei Fu	1997.0010002	6241

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EXAMINER	
DO, CHAT C	

ART UNIT	PAPER NUMBER
2124	10

DATE MAILED: 04/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/698,246	FU ET AL.	
	Examiner	Art Unit	
	Chat C. Do	2124	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 8-65* is/are pending in the application.

4a) Of the above claim(s) *62-65* is/are withdrawn from consideration.

5)☒ Claim(s) *26,27,29-34 and 45* is/are allowed.

6)☒ Claim(s) *1-4,8-14,17,35,36 and 46-61* is/are rejected.

7)☒ Claim(s) *15,16,18-25,28 and 37-44* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 5.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This communication is responsive to Amendments A and B, filed 12/08/2003 and 01/16/2004.

2. Claims 1-4 and 8-65 are pending in the application. Claims 1, 9, 26, 35, 45-46, 48, 50, 52-54, 56, 58, 60-62, and 64 are independent claims. In Amendments A and B, claims 5-7 are cancelled and claims 46-65 are newly added. This action is made non-final.

3. Claims 1-4 and 8-62 are examining.

4. Claims 62-65 are withdrawn from consideration.

Election/Restrictions

5. Newly submitted claims 62-65 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

The original claims 1-4 and 8-61 are drawn to an angular rotator for rotating an input complex number that is classified in class 708 subclass 200. However, the newly added claims 62-65 are drawn to a positive or negative multiplication of operands that is classified in class 708 subclass 625.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 62-65 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Objections

6. Claims 18 and 28 are objected to because of the following informalities:

Re claim 18, the limitation "wherein Θ_1 is an arcsin of said first value" is a repeated limitation of claim 17.

Re claim 28, the limitation "wherein Θ_m is an arctan of said first value" is a repeated limitation of claim 27.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 8, 17, 46-47, 50-52, and 54-60 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 8, the limitation "said ROM" lacks an antecedence basis. For examination purposes, the examiner considers the limitation as "said memory".

Re claim 17, the limitation "said first $\delta_{[\cos\Theta 1]}$ error value" lacks an antecedence basis. For examination purposes, the examiner considers the limitation as "a first $\delta_{[\cos\Theta 1]}$ error value".

Re claim 46, the limitation "representing tan Θ_M" is unclear whether it means an approximation of tan Θ_M or it means a number of tan Θ_M. For examination purposes, the

examiner considers the cited limitation as an approximation of tan θ_M. Claims 50, 52, 54, 56, 58, and 60 have similar problem.

Thus, claims 47, 51, 55, 57, and 59 are also rejected for being dependent on the rejected base claims 46, 50, 54, 56, and 58 respectively.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1, 3-4, 8-14, 35-36, 48, and 56 are rejected under 35 U.S.C. 103(a) as being obvious over Mayer (U.S. 4,340,939) in view of Fox et al. (U.S. 5,276,633).

Re claim 1, Mayer discloses in Figure 2 an angle rotator for rotating an input complex number to produce a rotated complex number (col. 1 lines 12-19) according to an input angle θ ($A = A_1 + A_2$), angle rotator comprising: a first digital circuit (20) that performs a coarse rotation on input number based on sin θ_M value and cos θ_M value (col. 3 lines 54-59 wherein the coarse increment adjustment is 45° and as seen in col. 2 equations 1), resulting in an intermediate number ($E(X_2)$ and $E(Y_2)$); a fine adjustment circuit (22) that generates a fine adjustment value based on a 0_L value, wherein $\theta_L = \theta - \theta_M (E(A_2))$; and a second digital circuit (22) that performs a fine rotation on intermediate number based on fine adjustment value, resulting in the rotated number (col. 1 lines 50-52). Mayer does not disclose a memory that stores a sin θ_M value and a cos θ_M value

wherein θ_M is a coarse approximation to input angle θ_M. However, Fox et al. disclose in Figure 3 extensively a sine/cosine generation for using in rotating angle by coarse and fine adjustment (abstract) wherein the sin θ_M value and a cos θ_M value is stored in memory (e.g. coarse adjustment 311 and 312; fine adjustment 331 and 332). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is make to add a memory for storing the pre-computed values of sin θ_M value and a cos θ_M as seen Fox et al.'s Figure 3 into Mayer's Figure 2 because it would enable to increase the system performance by simplifying the hardware for rotating at a desire angle (col. 2 lines 33-35).

Re claims 3-4, Mayer does not disclose first/second digital circuit is a butterfly circuit having a plurality of multipliers that multiply input number by sin θ_M value and cos θ_M value. However, Fox et al. disclose in Figure 3 a circuit is a butterfly circuit having a plurality of multipliers that multiply input number by sin θ_M value and cos θ_M value (col. 10 lines 51-55). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to include a plurality of multipliers that multiply input number by sin θ_M value and cos θ_M value as disclosed in Fox et al.'s invention to Figure 2 of Mayer because it would enable to increase simplify and increase the system performance.

Re claim 8, Mayer does not disclose that the ROM is indexed by θ_M. However, Fox et al. disclose in Figure 3 that the ROM is indexed by θ_M (311 and 312). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the

invention is made to replace the PROM in Mayer as ROM in Fox et al. because it would enable to retrieve the parameters faster and reduce the power consumption.

Re claim 9, it has the similar limitations cited in claim 1. Mayer does not disclose the memory is indexed by a MSW of input angle and the θ_M is a radian angle that corresponds to MSW of the input angle. However, Fox et al. disclose in Figure 2 the memory is indexed by a MSW of input angle and the θ_M is a radian angle that corresponds to MSW of the input angle (col. 2 lines 61-63). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to have a memory is indexed a MSW of input angle and the θ_M is a radian angle that corresponds to MSW of the input angle as seen in Fox et al.'s invention into Mayer's invention because it would enable to retrieve the values of sin and cosine faster.

Re claim 10, it has the same limitation as cited in claim 3. Thus, claim 10 is also rejected under the same rationale in the rejection of rejected claim 3.

Re claim 11, it has the same limitation as cited in claim 3. Thus, claim 11 is also rejected under the same rationale in the rejection of rejected claim 3.

Re claim 12, Mayer further discloses one or more quantization errors reflect finite memory storage for first and second values (col. 2 lines 10-17).

Re claim 13, Mayer further discloses first value includes a memory quantization error relative to sin θ_M value (θ_M is only the first two MSB of the input angle θ).

Re claim 14, Mayer further discloses first value is a binary n-bit approximation of sin θ_M value wherein n is a bit storage capacity for first value in memory (48 and 25 $E(Y_2)$).

Re claim 35, it is a method claim of claim 9. Thus, claim 35 is also rejected under the same rationale in the rejection of rejected claim 9.

Re claim 36, Mayer further discloses in Figure 5 step of determining comprises the step of retrieving first value and second value from a memory (48).

Re claim 48, it has similar limitations cited in claim 1. Thus, claim 48 is also rejected under the same rationale in the rejection of rejected claim 1.

Re claim 56, it has similar limitations cited in claim 1. Thus, claim 56 is also rejected under the same rationale in the rejection of rejected claim 1.

Response to Amendment

11. The amendments filed 12/018/2003 and 01/16/2004 are objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the limitation "this fine adjustment...negation of θ_L^2 /2" in lines 2-3 claim 2 and most limitations cited in claim 49, 51, 53, 56-61 as the fine adjustment value, the presentation of tan θ_M wherein θ_M is an approximation of input angle θ.

Applicant is required to cancel the new matter in the reply to this Office Action or point-out clearly lines in the original specification that supports these new cited matter.

Allowable Subject Matter

12. Claims 26-27, 29-34 and 45 are allowed.

13. Claims 15-16, 18-25, 28, and 37-44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. Claims 46, 50, 52, and 54 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

15. Claims 17, 47, 55 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

16. Applicant's arguments with respect to claims 1-4 and 8-61 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. U.S. Patent No. 6,466,958 to Van Wechel et al. disclose a parallel frequency searching in an acquisition correlator.

b. U.S. Patent No. 6,041,340 to Mintżer discloses a method for configuring an FPGA for large FFTS and other vector rotation computations.

c. U.S. Patent No. 4,893,316 to Janc et al. disclose a digital radio frequency receiver.

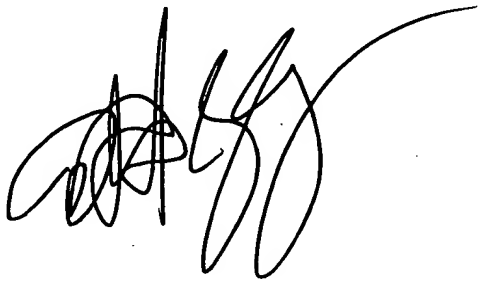
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (703) 305-5655. The examiner can normally be reached on M => F from 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (703) 305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do
Examiner
Art Unit 2124

April 6, 2004



TODD INGBERG
PRIMARY EXAMINER